IN THE CLAIMS:

1. A compound of the general formula: $R^1R^2R^4MR^5$, wherein R^1, R^2 and R^4 are independently an aryl, alkyl, alkenyl, epoxy or alkynyl group, wherein at least one of R^1, R^2 and R^4 is fully or partially fluorinated, wherein M is selected from group 14 of the periodic table, and wherein R^5 is either an alkoxy group, OR^3, or a halogen group, X.

2. The compound of claim 1, wherein X is Br or Cl.

3. The compound of claim 1, wherein R1, R2 and/or R4 is fully fluorinated.

4. The compound of claim 3, wherein R1, R2 and/or R4 is an alkenyl or alkynyl group.

5. The compound of claim 1, wherein R1, R2 and/or R4 is an alkyl group having from 1 to 14 carbons, vinyl or allyl group.

6. The compound of claim 1, wherein R1, R2 and/or R4 is an alkenyl group.

7. The compound of claim 1, wherein R1, R2 and/or R4 is a fully fluorinated alkenyl group.

8. The compound of claim 1, wherein R1, R2 and/or R4 is an aryl group having one or more rings, or an alkyl group having from 1 to 14 carbons.

9. The compound of claim 1, wherein R1, R2 and/or R4 is an alkynyl group.

10. The compound of claim 1, wherein R5 is an alkoxy groups.

11. The compound of claim 1, wherein R5 is a halogen group.

12. The compound of claim 1, wherein R1 is a fully or partially fluorinated phenyl group substituted with fully or partially fluorinated methyl, vinyl or ethyl groups.

13. The compound of claim 1, wherein OR3 is C1-C4 alkoxy.

14. The compound of claim 1, wherein M is Si, Ge, Al or Sn.

15. The compound of claim 1, wherein X is Cl.

16. The compound of claim 1, wherein X is Br.

17. The compound of claim 1, wherein R5 is methoxy.

18. The compound of claim 1, wherein R5 is an ethoxy or chlorine group.

19. The compound of claim 1, wherein R1, R2 and/or R4 is a C2 + straight chain or C3 + branched chain .

20. The compound of claim 1, wherein R1, R2 and/or R4 is a perfluorinated organic group having an unsaturated double bond.

21. The compound of claim 1, wherein R1, R2 and/or R4 is an epoxy group.

22. The compound of claim 1, wherein R1, R2 and/or R4 is an acrylate group.

23. The compound of claim 22, wherein M is Si or Ge.

24. The compound of claim 1, wherein R1, R2 and/or R4 is vinyl.

25. The compound of claim 24, wherein R1, R2 and/or R4 is fully fluorinated vinyl.

26. The compound of claim 1, wherein R5 is a methoxy, ethoxy or propoxy, M is Si and R1 is perfluorinated phenyl or perfluorinated vinyl.

27. The compound of claim 1, wherein R5 is bromine or chlorine, M is Si, and R1 is perfluorinated phenyl.

28. The compound of claim 1, wherein R4 and R5 are ethoxy, M is Si, and R1 is perfluorinated phenyl, or perfluorinated alkyl having from 2 to 8 carbons.

29. The compound of claim 28, wherein R1, R2 and/or R4 is perfluorinated ethyl or propyl.

30. The compound of claim 1, wherein OR3 is methoxy or ethoxy.

31. The compound of claim 1, wherein OR3 is ethoxy.

32. The compound of claim 1, wherein R1, R2 and/or R4 is a fully or partially fluorinated single ring or polycyclic aromatic substituent.

33. The compound of claim 32, wherein R1 and/or R4 has one or two rings.

34. The compound of claim 1, wherein M is Si.

35. The compound of claim 1, wherein R1 is methyl.

36. The compound of claim 1, wherein R1 is ethyl.

37. The compound of claim 1, wherein R1 is propyl.

38. The compound of claim 1, wherein R1 is an alkenyl group and R4 is an aryl group.

39. The compound of claim 1, wherein R1 is an epoxy group and R4 is an aryl group.

40. The compound of claim 1, wherein R1 is an alkynyl group and R4 is an aryl group.

41. The compound of claim 1, wherein R1 has an unsaturated double bond, and R4 has a ring structure.

42. The compound of claim 1, wherein R1 is an alkenyl group and R4 is an alkyl group.

43. The compound of claim 42, wherein R1 is an alkenyl group and R4 is an alkyl group having 4 or more carbons.

44. The compound of claim 1, wherein R1 is an epoxy group and R4 is an alkyl group.

45. The compound of claim 44, wherein R4 is an alkyl group having 4 or more carbons.

46. The compound of claim 1, wherein R1 is an alkynyl group and R4 is an alkyl group.

47. The compound of claim 1, wherein R1 is a vinyl group and R4 is an aryl group.

48. The compound of claim 47, wherein R4 is a phenyl group.

49. The compound of claim 48, wherein the phenyl group is a substituted phenyl group.

50. The compound of claim 1, wherein R1 is a methyl group and R4 is a vinyl or epoxy group.

51. The compound of claim 1, wherein both R1, R2 and R4 are fully fluorinated.

52. The compound of claim 1, wherein one of R1, R2 and R4 is fully fluorinated and the other is partially fluorinated.

53. The compound of claim 52, wherein the partially fluorinated group is an alkyl group having four or more carbon atoms, and wherein the fully fluorinated group is an alkenyl or aryl group.

54. The compound of claim 14, wherein M is Si or Ge.

55. The compound of claim 14, wherein M is Si.

56. The compound of claim 14, wherein M is Ge.

57. The compound of claim 1, wherein R1 and R2 are the same, but different from R4.

58. The compound of claim 1, wherein R1, R2 and R4 are the same.

59. The compound of claim 1, wherein R1, R2 and R4 are each different from each other.

60. A method for making the compound $R^1R^2R^4MR^5$ of claim 1, comprising:

providing a compound $R1MOR3_qX_{3-q}$ where M is an element selected from group 14 of the periodic table, OR3 is an alkoxy group, X is a halogen and q is 2 or 3;

reacting the compound $R1MOR3_qX_{3-q}$ with either a) Mg and R2X2 where X2 is Cl, Br or I and R1 is an alkyl, alkenyl, aryl, epoxy or alkynyl group, and q = 3, or b) with R2M1 where R2 is an alkyl, alkenyl, aryl, epoxy or alkynyl group and M1 is an element from group 1 of the periodic table, and q = 2 or 3;

so as to form $R1R2MOR3_2$;

reacting $R1MOR3_2$ with a) Mg and R4X2 where X2 is Cl, Br or I and R4 is an alkyl, alkenyl, aryl, epoxy or alkynyl group, or b) with R4M1 where R4 is an alkyl, alkenyl, aryl, epoxy or alkynyl group and wherein R4 is fully or partially fluorinated and M1 is an element from group 1 of the periodic table, or c) with a halogen or halogen

compound followed by reacting with R4M1 where R2 is an alkyl, alkenyl, aryl, epoxy or alkynyl group, wherein M1 is an element from group 1 of the periodic table;

so as to form $R^1R^2R^4MOR^3_q$;

and wherein if R^5 is a halogen, reacting $R^1R^2R^4MOR^3_q$

with a halogen or halogen compound.

61. A method for using the compound of claim 1, comprising:

providing the compound of claim 1;

hydrolyzing the compound of claim 1 in the presence of H2O or D2O with another compound;

so as to form a compound with an –M-O-M-O- backbone with at least R1, R2 and R4 groups bound thereto and having a molecular weight of from 500 to 10,000.

62. The method of claim 61, wherein the compound has a molecular weight of from 1500 to 5000.